Additional stack height will be required to cover the friction in the stack; this additional height may be approximated as follows: Assume about 5 m 00 in height required for this purpose; then

$$h = \frac{0.0053 \times 6 - 28 \times 3 \times 1 \wedge -5 \times 13.00 \times 0.412}{\text{L}\ _\ _\ \text{----------}_} = 5\ \text{m}\ 15.$$

The total height of the chimney will be

63 m 50+5 m 15 = 68 m 65 = 225 ft.

Additional chimney height might be desirable in order to provide a larger margin for increased draft resistance toward the end of a campaign, due to blocking up of the checkerwork. A different fuel, a different method of operation, or a reduction or increase in fuel consumption will modify these figures, but this method of analysis may be applied^ not only to such cases, but likewise to the design of other types of regenerative furnaces.

In connection with the reversing valves, a factor of importance is the depth of the water seal. In the case of the gas valve, this seal is exposed upon one side to the pressure within the gas main, while the other is influenced by the draft depression at the valve. The air-valve seal is influenced by the stack depression. In the case of the gas valve, the gas pressure will be approximately 0.50 in of water and the draft depression about 1.50 in of water, making a total differential of 2.00 in of water. Gases, when their flow is interrupted, have a tendency to produce a rise in pressure, as water does. Therefore, with a 3-in water seal, only 1 in. of which is effective, there is the possibility of a blow-through.

Practically all reversing valves present more or less of a direct connection between the gas main and the stack flue or the air, during reversal, unless special dampers or other means are provided to prevent this. Some of the devices designed to operate dampers for this purpose are so arranged that the water seal on

the valve is broken before the dampers have cut off either the gas main or the chimney flue. There is, however, no particular difficulty in arranging a mechanism or a valve which will completely cut the furnace and flues off from the stack and the air during reversal.

One of the main reasons why open-hearth progress has been very slow is that space around the valves is limited, and it is